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Remarks/Arguments

In the Final Office Action, all pending claim rejections under either 35 U.S.C. § 102 or 103 were maintained. In light of the amendments listed above, and the remarks below, Applicant requests reconsideration of the Examiner's positions and allowance of all pending claims.

Simply stated, the applicant has discovered that storage system performance and operation is greatly improved by interleaving reference patterns with the data when it is written to the storage media. This interleaved data set is then written to the data storage sections of the media – that area between headers or synchronization structures previously placed on the media. Once written, the media will contain a number of written marks and spaces in the data storage areas, as is typical for any storage system. The difference however, is that reference patterns are periodically placed at user defined locations, which allow for periodic verification of operating parameters. These reference patterns are easily implemented since they are handled the same as data when writing to the media surface. (Incidentally, they could easily be used in conjunction with physical marks previously placed on the media surface.)

Again, the raw data to be stored on the media surface is interleaved with reference data in a user directed, predetermined format. This interleaving step is undertaken either prior to the writing of any information on the media surface, or concurrently therewith. Thus, the step of "storing" includes writing both structures to the media, and allows the user to control the details of this implementation. By having the reference data included, the readout system is then able to periodically check the operation of the data storage system – either data retrieval or data storage itself. By configuring this reference data in an appropriate manner, several different optimization functions are achieved, including gain and phase settings for the readout system,

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along with error correction methodologies. Further, by allowing the user to control the placement of reference data, these updates can be optimized for the particular system. These features are specifically recited in the amended claims set forth above.

In the Office Action, U.S. Patent 5,875,163 to Kuroda et al. (Kuroda) has been utilized as the basis for all claim rejections. Examining Kuroda in detail however, reveals that this reference does not disclose or make obvious the claimed invention. Most significantly, Kuroda outlines a storage system which utilizes disk pre-pits in order to arrange data. Kuroda outlines how pre-information is used within a sync frame. This pre-information is formed on the disk by creating pre-pits on the surface. These structures are formed by the media manufacturer prior to delivery or use in a data storage system.

The Examiner has suggested that pre-information is not same as pre-pit information in Kuroda. In response, the Examiner is directed to specific text within Kuroda which states otherwise. More specifically, Kuroda outlines how "the pre-information is recorded by forming pre-pits onto the land tracks by using a cutting apparatus, for example." *Kuroda, col. 5, lines 5-7.* Further "Pre-pits 4 corresponding to the pre-information are formed on the land tracks 3 by the cutting apparatus or the like. The pre-pits 4 are previously formed before shipping of the DVD-R1." *Id., col. 5, lines 18-21.* When discussing actual operation, Kuroda goes on to state that "the pre-information is detected from the pre-pit 4 prior to recording of information by a tangential push-pull method, which will be explained hereinafter." *Id., col. 5, lines 42-44.* Further reading of Kuroda clearly outlines how all pre-information is stored on media by forming pre-pits. *See, e.g. col. 6, lines 16-21* (outlining how variations in the pre-information pattern are required due to problems when pre-pits are concentrated in one area.); *col. 7, lines 35-42*

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(outlining how a laser diode and photo-detector are utilized to retrieve pre-information which has been recorded by forming the pre-pits); *col. 7, lines 42-45* (general discussion regarding the use of pre-pit signal reproducing circuit 11 for reproducing pre-information).

Most significantly, however, Kuroda does not include reference data interleaved with data to be stored, as contemplated by the present invention. The Kuroda storage system is limited to the physical structure located on the surface of the media. This is similar to most media systems utilizing pre-pit addressing and synchronization techniques, but is very different from the claimed invention. The Examiner has apparently concluded that the resulting overall structure of Kuroda results in an interleaved pattern. However, this pattern is clearly achieved by first creating the physical structure upon the disk surface, which has pre-information formed by pre-pits. Subsequently, data is simply written to the areas between these pre-pits (i.e., the data storage areas of the disk). This issue of timing is significant as the pre-pit structure clearly provides limitations and shortcomings that the present invention was specifically designed to overcome. This feature is apparently being overlooked by the Examiner.

The interleaving of reference data, as contemplated by the present invention, goes beyond the pre-pit methodology of Kuroda, and provides unique and valuable features not contemplated. Further, the interleaving techniques of the present invention provide flexibility for the data storage system. For example, the reference fields could be placed at any selected distance from one another in order to provide tailored updates needed for a storage system. In certain instances, it is beneficial to provide this reference data at a more frequent rate, thus providing more frequent updates. Alternatively, a storage system may utilize fewer occurrences of the reference data, thus maximizing data storage capacity and reducing overhead. Clearly, this is a

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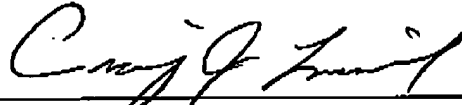Page 11 of 11

much different methodology and scheme than those utilized by systems relying solely on pre-pit

information provided on the media surface.

CONCLUSION

Applicant submits that for at least the reasons stated above all pending claims are

allowable over the art of record. As such, Applicant respectfully requests reconsideration and

that a Notice of Allowance be issued in this case.

In the event a telephone conversation would expedite the prosecution of this application,

the Examiner may reach the undersigned at (612) 607-7387. If any fees are due in connection

with the filing of this paper, then the Commissioner is authorized to charge such fees including

fees for any extension of time, to Deposit Account No. 50-1901 (Docket 18504/333).

Respectfully submitted,

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